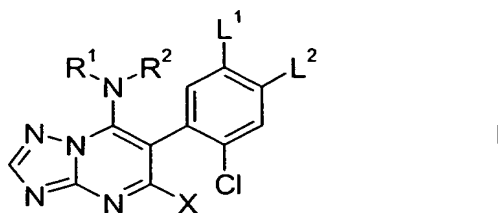


What is claimed is:

1. A triazolopyrimidine of the formula I



5 in which the substituents are as defined below:

10  $R^1, R^2$  independently of one another are hydrogen,  $C_1$ - $C_8$ -alkyl,  $C_1$ - $C_8$ -haloalkyl,  $C_3$ - $C_8$ -cycloalkyl,  $C_3$ - $C_8$ -halocycloalkyl,  $C_2$ - $C_8$ -alkenyl,  $C_2$ - $C_8$ -haloalkenyl,  $C_3$ - $C_6$ -cycloalkenyl,  $C_3$ - $C_6$ -halocycloalkenyl,  $C_2$ - $C_8$ -alkynyl,  $C_2$ - $C_8$ -haloalkynyl or phenyl, naphthyl, or a 5- or 6-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S,

15  $R^1$  and  $R^2$  together with the nitrogen atom to which they are attached may also form a 5- or 6-membered heterocyclyl or heteroaryl which is attached via N and may contain 1 to 3 further heteroatoms from the group consisting of O, N and S as ring members and/or may carry one or more substituents from the group consisting of halogen,  $C_1$ - $C_6$ -alkyl,  $C_1$ - $C_6$ -haloalkyl,  $C_2$ - $C_6$ -alkenyl,  $C_2$ - $C_6$ -haloalkenyl,  $C_1$ - $C_6$ -alkoxy,  $C_1$ - $C_6$ -haloalkoxy, 20  $C_3$ - $C_6$ -alkenyloxy,  $C_3$ - $C_6$ -haloalkenyloxy, (exo)- $C_1$ - $C_6$ -alkylene and oxy- $C_1$ - $C_3$ -alkyleneoxy;

$R^1$  and/or  $R^2$  may carry one to four identical or different groups  $R^a$ :

25  $R^a$  is halogen, cyano, nitro, hydroxyl,  $C_1$ - $C_6$ -alkyl,  $C_1$ - $C_6$ -haloalkyl,  $C_1$ - $C_6$ -alkylcarbonyl,  $C_3$ - $C_6$ -cycloalkyl,  $C_1$ - $C_6$ -alkoxy,  $C_1$ - $C_6$ -haloalkoxy,  $C_1$ - $C_6$ -alkoxycarbonyl,  $C_1$ - $C_6$ -alkylthio,  $C_1$ - $C_6$ -alkylamino, di- $C_1$ - $C_6$ -alkylamino,  $C_2$ - $C_8$ -alkenyl,  $C_2$ - $C_8$ -haloalkenyl,  $C_3$ - $C_8$ -cycloalkenyl,  $C_2$ - $C_6$ -alkenyloxy,  $C_3$ - $C_6$ -haloalkenyloxy, 30  $C_2$ - $C_6$ -alkynyl,  $C_2$ - $C_6$ -haloalkynyl,  $C_3$ - $C_6$ -alkynyloxy,  $C_3$ - $C_6$ -haloalkynyloxy,  $C_3$ - $C_6$ -cycloalkoxy,  $C_3$ - $C_6$ -cycloalkenyloxy, oxy- $C_1$ - $C_3$ -alkyleneoxy, phenyl, naphthyl, a 5- to 10-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S, 35

where these aliphatic, alicyclic or aromatic groups for their part may be partially or fully halogenated or may carry one to three groups  $R^b$ :

## 35

5  $R^b$  is halogen, cyano, nitro, hydroxyl, mercapto, amino, carboxyl, aminocarbonyl, aminothiocarbonyl, alkyl, haloalkyl, alkenyl, alkenyloxy, alkynyloxy, alkoxy, haloalkoxy, alkylthio, alkylamino, dialkylamino, formyl, alkylcarbonyl, alkylsulfonyl, alkylsulfoxy, alkoxy carbonyl, alkylcarbonyloxy, alkylaminocarbonyl, dialkylaminocarbonyl, alkylaminothiocarbonyl, dialkylaminothiocarbonyl, where the alkyl groups in these radicals contain 1 to 6 carbon atoms and the alkenyl or alkynyl groups mentioned in these radicals contain 2 to 8 carbon atoms;

10

and/or one to three of the following radicals:

15 cycloalkyl, cycloalkoxy, heterocyclyl, heterocyclyloxy, where the cyclic systems contain 3 to 10 ring members; aryl, aryloxy, arylthio, aryl- $C_1$ - $C_6$ -alkoxy, aryl- $C_1$ - $C_6$ -alkyl, hetaryl, hetaryloxy, hetarylthio, where the aryl radicals preferably contain 6 to 10 ring members and the hetaryl radicals 5 or 6 ring members, where the cyclic systems may be partially or fully halogenated or substituted by alkyl or haloalkyl groups;

20

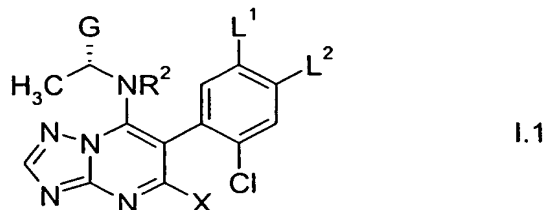
$L^1$  is fluorine, chlorine or bromine;

25  $L^2$  is hydrogen,  $C_1$ - $C_4$ -alkyl or  $C_1$ - $C_4$ -alkoxy; and

$X$  is halogen, cyano,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_2$ -haloalkoxy.

- 30 2. The compound of the formula I according to claim 1 in which  $L^2$  is hydrogen.
3. The compound of the formula I according to claim 1 in which  $L^2$  is alkyl or alkoxy.
- 35 4. The compound of the formula I according to any of claims 1 to 3 in which  $L^1$  is fluorine.
5. The compound of the formula I according to any of claims 1 to 3 in which  $L^1$  is chlorine.
- 40 6. The compound of the formula I according to any of claims 1 to 5 in which  $R^1$  is not hydrogen.

7. The compound of the formula I according to any of claims 1 to 6 in which X is chlorine.
8. A compound of the formula I.1:



5

in which

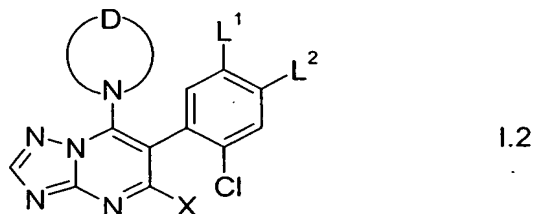
G is C<sub>2</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxymethyl or C<sub>3</sub>-C<sub>6</sub>-cycloalkyl;

R<sup>2</sup> is hydrogen or methyl; and

X is chlorine, methyl, cyano, methoxy or ethoxy

10 and L<sup>1</sup> and L<sup>2</sup> are as defined in any of claims 1 to 5.

9. A compound of the formula I.2:

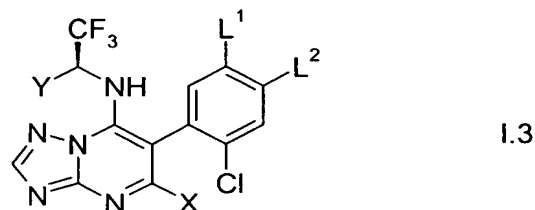


in which

15 D together with the nitrogen atom forms a 5- or 6-membered heterocyclyl or heteroaryl which is attached via N and may contain a further heteroatom from the group consisting of O, N and S as ring member and/or may carry one or more substituents from the group consisting of halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy and C<sub>1</sub>-C<sub>2</sub>-haloalkyl;

20 X is chlorine, methyl, cyano, methoxy or ethoxy and L<sup>1</sup> and L<sup>2</sup> are as defined in one of claims 1 to 5.

10. A compound of the formula I.3:

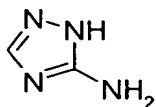


25 in which Y is hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl;

X is chlorine, methyl, cyano, methoxy or ethoxy and L<sup>1</sup> and L<sup>2</sup> are as defined in any of claims 1 to 5.

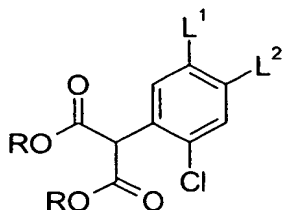
## 37

11. A process for preparing a compound of the formula I according to either of claims 1 to 7, in which X is halogen, cyano, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>2</sub>-haloalkoxy by reaction of 5-aminotriazole of the formula II



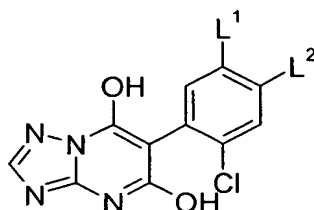
II

- 5 with phenylmalonates of the formula III



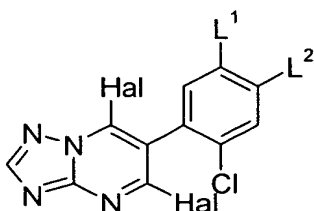
III

in which R is alkyl, to give dihydroxytriazolopyrimidines of the formula IV,



IV

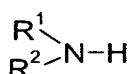
halogenation to give the dihalo compounds of the formula V,



V

10

and reaction of V with amines of the formula VI



VI

to give compounds of the formula I in which X is halogen, if desired, to prepare compounds I in which X is cyano, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>2</sub>-haloalkoxy, reaction of compounds I in which X is halogen with compounds of the formula VII,

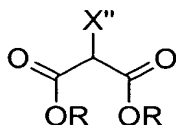
15

M-X'

VII

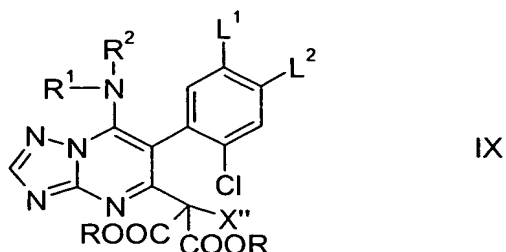
which, depending on the group X' to be introduced, are inorganic cyanides, alkoxides or haloalkoxides and in which M is an ammonium, tetraalkylammonium, alkali metal or alkaline earth metal cation, and, if desired, to prepare compounds of the formula I according to claim 1, in which X is alkyl, by reaction of the compounds I in which X is halogen with malonates of the formula VIII,

20



VIII

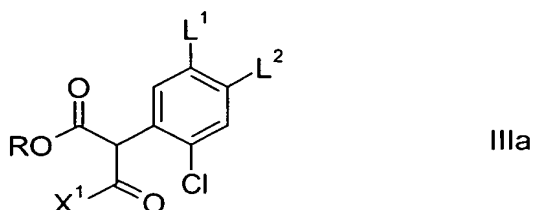
in which X" is hydrogen or C<sub>1</sub>-C<sub>3</sub>-alkyl and R is C<sub>1</sub>-C<sub>4</sub>-alkyl, to give compounds of the formula IX



and decarboxylation to compounds I in which X is alkyl.

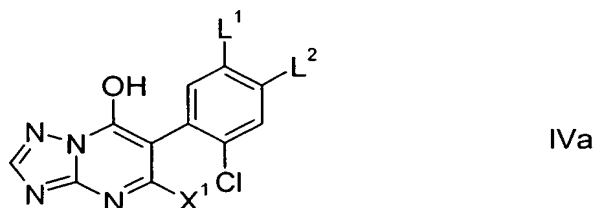
5

12. A process for preparing a compound of the formula I according to any of claims 1 to 6 in which X is C<sub>1</sub>-C<sub>4</sub>-alkyl or C<sub>1</sub>-C<sub>4</sub>-haloalkyl by reaction of 5-amino-1,2,4-triazole of the formula II as set forth in claim 11 with keto esters of the formula IIIa,

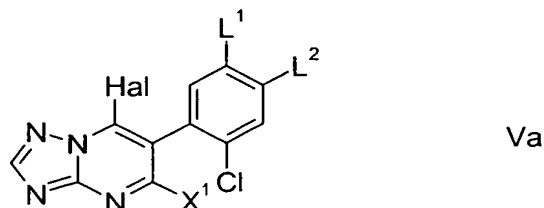


10

in which X<sup>1</sup> is C<sub>1</sub>-C<sub>4</sub>-alkyl or C<sub>1</sub>-C<sub>4</sub>-haloalkyl and R is C<sub>1</sub>-C<sub>4</sub>-alkyl, to give 5-alkyl-7-hydroxy-6-phenyl-1,2,4-triazolopyrimidines of the formula IVa,



halogenation of IVa to give 7-halotriazolopyrimidines of the formula Va



15

and reaction of Va with amines of the formula VI as set forth in claim 11 to give compounds I.

13. A compound of the formula IV, IVa, V or Va as set forth in claim 11 or 12.

20

14. A fungicidal composition, comprising a solid or liquid carrier and a compound of the formula I according to any of claims 1 to 7.

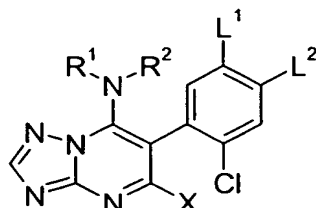
15. Seed, comprising 1 to 1000 g of a compound of the formula I according to any of claims 1 to 3 per 100 kg.
- 5 16. A method for controlling phytopathogenic harmful fungi, which method comprises treating the fungi or the materials, plants, the soil or seed to be protected against fungal attack with an effective amount of a compound of the formula I according to any of claims 1 to 7.

6-(2-Chloro-5-halophenyl)triazolopyrimidines, their preparation and their use for controlling harmful fungi, and compositions comprising these compounds

Abstract

5

Substituted triazolopyrimidines of the formula I



in which the substituents are as defined below:

- 10 R<sup>1</sup>, R<sup>2</sup> are hydrogen, alkyl, haloalkyl, cycloalkyl, halocycloalkyl, alkenyl, haloalkenyl, cycloalkenyl, halocycloalkenyl, alkynyl, haloalkynyl or phenyl, naphthyl, or a five- or six-membered saturated, partially unsaturated or aromatic heterocycle which contains one to four heteroatoms from the group consisting of O, N and S,
- 15 R<sup>1</sup> and R<sup>2</sup> together with the nitrogen atom to which they are attached may also form a five- or six-membered heterocyclyl or heteroaryl which is attached via N and contains one to three further heteroatoms from the group consisting of O, N and S as ring member and is substituted according to the description;
- 20 L<sup>1</sup> is fluorine, chlorine or bromine;
- L<sup>2</sup> is hydrogen, alkyl or alkoxy; and
- X is halogen, cyano, alkyl, haloalkyl, alkoxy or haloalkoxy;

25

processes and intermediate for preparing these compounds, compositions comprising them and their use for controlling phytopathogenic harmful fungi.